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REMARKS

This response is intended as a full and complete response to the Office Action mailed on March 14, 2005. In view of the following discussion, the Applicants believe that all claims are in allowable form.

CLAIM REJECTIONS

35 U.S.C. §112 Claim 48

Claim 48 stands rejected under 35 USC §112 as not currently existing. In response, the Applicants have listed claim 48 as cancelled. Claims 49-50 remain pending as originally numbered. Accordingly, the Applicants respectfully request the rejection be withdrawn.

35 U.S.C. §102

Claims 1, 5-6, 10-11, 13-15, 17, 19-25, 28-92, 31-35, 38-40, 42-47 and 49 stand rejected as being anticipated by United States Patent No. 4,423,701, issued April 2, 2005 to *Ting, et al.* (hereinafter *Ting*). The Applicants respectfully disagree. However, the Applicants have amended claim 1 to more clearly recite aspects of the invention.

A. Claims 1, 5-6, and 13-15

Independent claim 1, as amended, recites limitations not taught or suggested by *Ting*. *Ting* teaches a multiple station processing chamber for use in depositing and/or removing a material on a semi-conductor wafer by subjecting the wafer to an electric field and a processing fluid, *i.e.*, in an electrolyte. In each of the disclosed embodiments and alternatives, *Ting* teaches deposition or removal of a material on a substrate by a technique of electroplating or electropolishing using an electrolyte (*Ting*, col. 4, ll. 5-47). As such, and as agreed to by Examiner Kosowski in an interview on June 8, 2005 with Alan Taboada, *Ting* fails to teach or suggest a vacuum deposition chamber wherein the deposition chamber is divided into two or more deposition regions that are integrally connected to one another, as recited in claim 1.

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Thus, the Applicants submit that independent claim 1, and claims 5-6 and 13-15 depending therefrom, are patentable over *Ting*. Accordingly, the Applicants respectfully requested that the rejection be withdrawn and the claims allowed.

B. Claims 10-11

Independent claims 10 and 11 recite limitations not taught or suggested by *Ting*. Specifically, *Ting* fails to teach or suggest a cyclic process of repeating the steps of moving the wafer support with the substrate thereon into the first deposition region wherein a first monolayer of the first deposition gas is chemisorbed onto the surface of the substrate, and changing the elevation of the wafer support to transport the substrate thereon to the second deposition region wherein a first monolayer of the second deposition gas is chemisorbed onto the first monolayer of the first deposition gas, as recited in claims 10 and 11.

Specifically, *Ting* teaches an apparatus for electropolishing or electroplating. *Ting* fails to teach or suggest introducing a first deposition gas into a first deposition region and a second deposition gas into a second deposition region. In addition, *Ting* fails to teach or suggest depositing a monolayer onto a substrate. Moreover, *Ting* fails to teach or suggest depositing a first monolayer onto a substrate by chemisorption of a first deposition gas and depositing a second monolayer onto the first monolayer by chemisorption of a second deposition gas, as recited in claims 10 and 11.

Ting further fails to teach or suggest a cyclic deposition process that repeatedly cycles the deposition steps between the first deposition region and the second deposition region until a material layer having desired thickness is achieved. The Examiner cites *Ting*, col. 3, ll. 1-16 to support his assertion that *Ting* teaches moving the wafer support with the substrate thereon into the first deposition region and into the second deposition region in a cyclical manner, as recited in claims 10 and 11. However, the lines cited by the Examiner – and all other teachings of *Ting* – teaches a process using a multiple station processing chamber wherein the wafer is moved from station to station in a sequential

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manner until all processing steps have been completed. (*Ting*, col. 3, ll. 1-16; col. 11, ll. 42-65.) Thus, *Ting* fails to teach or suggest a cyclic deposition process that repeatedly deposits a first monolayer from a first deposition gas in a first deposition region and a second monolayer from a second deposition gas in a second deposition region until a desired film thickness is achieved, as recited in claims 10 and 11.

Therefore, and as agreed to by Examiner Kosowski in the June 8, 2005 interview, *Ting* fails to teach or suggest a method of depositing a material layer on a substrate (or a computer storage medium containing a software routine that when executed causes a general purpose computer to control a process chamber using a layer deposition method) that includes introducing a first deposition gas into the first deposition region and a second deposition gas into the second deposition region, moving the wafer support with the substrate thereon into the first deposition region wherein a first monolayer of the first deposition gas is chemisorbed onto the surface of the substrate, changing the elevation of the wafer support to transport the substrate thereon into the second deposition region wherein a first monolayer of the second deposition gas is chemisorbed on the first monolayer of the first deposition gas, and repeating steps (c) and (d) until a material layer having a desired thickness is achieved, as recited in claims 10 and 11.

Thus, the Applicants submit independent claims 10 and 11 are patentable over *Ting*. Accordingly, the Applicants respectfully requested that the rejection be withdrawn and the claims allowed.

C. Claims 17, 19-25, 28-29, 31-35, 38-40, 42-47, and 49.

Independent claims 17, 20, 29 and 42 each recite limitations not taught or suggested by *Ting*. As discussed above, *Ting* fails to teach or suggest depositing a monolayer on the substrate support in the first deposition region, as recited in claim 17. *Ting* similarly fails to teach or suggest an apparatus for processing a substrate having a deposition chamber being adapted to support a

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deposition of a monolayer upon a surface of a substrate, as recited in independent claims 20, 29 and 42.

The Examiner specifically cites col. 1, l. 56 – col. 2, l. 11 of *Ting* to support the assertion that *Ting* teaches an apparatus having at least one deposition region adapted to support deposition via chemisorption. The Applicants respectfully disagree. The portion of *Ting* relied upon by the Examiner is contained within the background of the invention, wherein *Ting* merely mentions that various techniques are known to deposit or remove materials on a wafer, including immersion of the wafer in an electrolyte. (*Ting*, col. 1, l. 56 – col. 2, l. 11.) These processes are merely mentioned in passing as a segue to a discussion of the problems existing in conventional processes that immerse the wafer in electrolyte, thereby setting up the basis for the invention of *Ting*. However, *Ting* fails to teach or suggest at the cited location, or in any other location, that any of the deposition stations of the multiple station processing chamber disclosed by *Ting* is capable of supporting deposition of a first monolayer on the surface of the substrate.

Therefore, *Ting* fails to teach or suggest depositing a monolayer on the substrate support in the first deposition region, as recited in claim 17, or an apparatus for processing a substrate having a deposition chamber adapted to support a deposition of a monolayer upon a surface of a substrate, as recited in independent claims 20, 29 and 42.

Thus, the Applicants submit that independent claims 17, 20, 29, and 42, and all claims depending there from, are patentable over *Ting*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claims allowed.

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35 U.S.C. §103

A. Claim 2

Claim 2 stands rejected as being unpatentable over *Ting* in view of United States Patent No. 5,518,542 issued May 21, 1996 to *Matsukawa et al.*, (hereinafter *Matsukawa*). The Applicants respectfully disagree.

As discussed above, independent claim 1, from which claim 2 depends, recites limitations not taught or suggested by the combination of *Ting* and *Matsukawa*. The teachings of *Ting* are discussed above. *Matsukawa* teaches a wafer cleaning apparatus having a wafer support that is vertically movable by a piston. Thus, utilizing a piston as taught by *Matsukawa* in the electroplating or electrodeposition apparatus of *Ting* still fails to teach or suggest a vacuum deposition chamber having a wafer support disposed therein that is vertically moveable in between two or more interconnected deposition regions, as recited by claim 1. As such, a *prima facie* case of obviousness has not been established because the combination of *Ting* and *Matsukawa* fails to teach or suggest the limitations recited in claim 1.

Thus, the Applicants submit that claim 2 is patentable over *Ting* in view of *Matsukawa*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claims allowed.

B. Claims 3 and 7-9

Claims 3 and 7-9 stand rejected as being unpatentable over *Ting* in view of United States Patent No. 6,497,767, issued December 24, 2002 to *Okase, et al.*, (hereinafter *Okase*). The Applicants respectfully disagree.

Independent claim 1, from which claims 3 and 7-9 depend, recites limitations not taught or suggested by the combination of *Ting* and *Okase*. The teachings of *Ting* are discussed above. *Okase* teaches a thermal processing unit for a single substrate. However, *Okase* fails to teach or suggest a modification of *Ting* that yields a vacuum deposition chamber having a wafer support disposed therein that is vertically moveable between two or more interconnected deposition regions, as recited by claim 1. As such, a *prima facie*

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case of obviousness has not been established because the combination of *Ting* and *Okase* fails to teach or suggest the limitations recited in claim 1.

Thus, the Applicants submit that claims 3 and 7-9 are patentable over *Ting* in view of *Okase*. Accordingly the Applicants respectfully request that the rejection be withdrawn and the claims allowed.

C. Claim 4

Claim 4 stands rejected as being unpatentable over *Ting* in view of United States Patent No. 6, 387, 185, issued May 14, 2002 to *Doering, et al.* (hereinafter *Doering*). The Applicants respectfully disagree.

Independent claim 1, from which claim 4 depends, recites limitations not taught or suggested by the combination of *Ting* and *Doering*. The teachings of *Ting* have been discussed above. *Doering* teaches a processing chamber in which an electrostatic chuck may be used to support a semiconductor wafer during processing. *Doering* does not teach or suggest processing a substrate in separate regions of a deposition chamber. Thus, utilizing an electrostatic chuck as taught by *Doering* to modify the deposition system of *Ting* still fails to teach or suggest a vacuum deposition chamber having a wafer support disposed therein that is vertically moveable between two or more interconnected deposition regions, as recited by claim 1. As such, a *prima facie* case of obviousness has not been established because the combination of *Ting* and *Doering* fails to teach or suggest the limitations recited in claim 1.

Thus, the Applicants submit that claim 4 is patentable over *Ting* in view of *Doering*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claims allowed.

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D. Claims 18, 27, and 30

Claims 18, 27 and 30 stand rejected as being unpatentable over *Ting* in view of United States Patent No. 5,916,365, issued June 29, 1999 to *Sherman* (hereinafter *Sherman*). The Applicants respectfully disagree.

Independent claims 17, 20 and 29, from which claims 18, 27, and 30 respectfully depend, recite limitations not taught or suggested by the combination of *Ting* and *Sherman*. As discussed above, *Ting* discloses an electroplating/polishing apparatus wherein a substrate is immersed in an electrolyte. *Ting* fails to teach or suggest forming a monolayer on a substrate. *Sherman* teaches an apparatus for sequential chemical vapor deposition by forming a first monolayer using a first reacting gas and providing a second reacting gas that may react with the monolayer in a single deposition chamber. However, the gas deposition teachings of *Sherman* are incompatible with the electroplating/polishing apparatus of *Ting*.

Therefore, the references may not be combined in a manner that yields a method or apparatus that deposits a first monolayer on the wafer in a first deposition region and a second monolayer on the wafer in the second deposition region, as recited by claims 17, 20 and 29. As such, a *prima facie* case of obviousness has not been established because the combination of *Ting* and *Sherman* fails to teach or suggest the limitations recited in claims 17, 20 and 29.

Thus, the Applicants submit that claims 18, 27 and 30 are patentable over *Ting* in view of *Sherman*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claims allowed.

E. Claims 26, 36, 41 and 50

Claims 26, 36, 41 and 50 stand rejected as being unpatentable over *Ting* in view of United States Patent No. 4,423,701, issued January 3, 1984 to *Nath, et al.* (hereinafter *Nath*). The Applicants respectfully disagree.

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Independent claims 20, 29 and 42, from which claims 26, 36, 41 and 50 depend, recite limitations not taught or suggested by the combination of *Ting* and *Nath*. As discussed above, *Ting* discloses an electroplating/polishing apparatus wherein a substrate is immersed in an electrolyte. *Ting* fails to teach or suggest forming a monolayer on a substrate. *Nath* teaches a multi-deposition chamber device whereby multiple deposition chambers are located side by side. A continuous web of substrate material moves horizontally between the deposition chambers and vertically within the chambers wherein successive layers of amorphous semiconductor material is deposited thereon. (*Nath*, col. 7 l. 67 – col. 8, l. 19; Figure 4).

However, *Nath* fails to teach or suggest depositing a monolayer upon the surface of the substrate. As such, *Nath* fails to teach or suggest a modification to the teachings of *Ting* that would yield a deposition chamber divided into two or more deposition regions that are integrally connected to one another, at least one of the said regions being adapted to support deposition of a monolayer upon the surface of a substrate, as recited in independent claims 20, 29 and 42.

Thus, the Applicants submit that claims 26, 36, 41 and 50 are patentable over *Ting* in view of *Nath*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claims allowed.

NEW CLAIMS

New claims 51-54 have been added to the application. The Applicants submit that no new matter has been added. New claims 51-54 respectively depend from independent claims 17, 20, 29, and 42 and are patentable for at least the reasons set forth above. Moreover, the respective claims add the limitation that the deposition chamber is a vacuum deposition chamber. As discussed above, the Examiner has agreed that *Ting* does not teach or suggest a vacuum deposition chamber.

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Thus, the Applicants submit that claims 51-54 are patentable over the cited art. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claims allowed.


CONCLUSION

Thus, the Applicants submit that all claims now pending are in condition for allowance. Accordingly, both reconsideration of this application and swift passage to issue are earnestly solicited.

If the Examiner believes that any unresolved issues still exist, it is requested that the Examiner telephone Keith Taboada at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

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Date


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